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# Aerosols upwind of Mexico City during the MILAGRO campaign: regional scale biomass burning, dust and volcanic ash from aircraft measurements

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During the MILAGRO Campaign March/April 2006 a series of aircraft flights with the FZK microlight D-MIFU were performed in the area southeast of Mexico City starting from Puebla airport, circling the national park area of Ixtachiuatl and Popocatepetl and scanning the Chalco valley down to Cuautla in the Cuernavaca province. All flights were combined with vertical profiles up to 4500 m a.s.l. in several locations, typically north of volcano Ixtachiuatl on the Puebla side, above Chalco or Tenago del Aire and south of volcano Popocatepetl, either at Cuautla or Atlixco. In Tenango del Aire a ceilometer was additionally operated continuously for characterization of the planetary boundary layer. The aircraft carried a set of aerosol instrumentation, fine and coarse particles and size distributions as well as a 7 wavelength aethalometer. Additionally meteorological parameters, temperature and dewpoint, global radiation and actinic radiation balance, respectively photolysis rates, and ozone concentrations were measured. The instrumentation allowed to characterize the aerosol according to their sources and also their impact on radiation transfer. Biomass burning aerosol, windblown dust and volcanic ash were identified within the upwind area of Mexico City with large differences between the dry season in the first weeks of the campaign and the by far cleaner situation after beginning thunderstorm activity towards the end of the campaign. Also the aerosol characteristics inside and outside the Mexico City basin were often completely different. With wind speeds of $\tilde{5}$ m/sec from southerly directions in the Chalco valley the aerosol mixture can reach the City within $\tilde{2}$ h. Rural aerosol mixtures from the Cuernavaca plain were mixed during the transport with dust from the MC basin. Very high intensity biomass burning plumes normally reached higher altitudes and produced pyrocumulus clouds. These aerosols were injected mainly into the free troposphere. Within the MC basin a large fraction of the aerosol consists of windblown dust lifted up to 2 km above ground level by dust devils.